Don't Expose Yourself: Discretionary Exposure to Political Information

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Summary: The news media have been disrupted. Broadcasting has given way to narrowcasting, a few reputable producers to millions with shallower reputations, and editorial control to control by friends and personalization algorithms. These profound changes have justly brought concerns over selective exposure to the fore. These concerns have been amplified by the rapid rise in partisan polarization.

Keywords: Selective Exposure, Partisan Media, Echo Chambers, Filter Bubbles

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We live in the proverbial information age. A myriad of stimuli constantly vie for our attention. And we constantly decide which stimulus to attend to. Much of the decision-making happens 'automatically', beyond our conscious control. Vital as such decisions are, the chapter doesn't discuss them. Instead, it focuses on the complementary question. How do people consciously choose what information to attend to?

We begin with a patent premise. People consume the media they prefer. They choose from a rich, near unlimited, menu. And deduce what they prefer based on information that is easily available to them. Their deductions are often flawed. Limited available information, finite cognitive capacity, a bias toward cognitive miserliness, among other things, circumscribe our ability to choose correctly.

On rare occasions what we want is not on the menu. More often, what we want isn't easy to find. Other times the available information leads us astray. For instance, when deciding, name of the outlet is often one of the few pieces of information we have. But sources cues can mislead. For instance, *The New York Times* may lean liberal, but it often carries news that is congenial to the right (Garz et al. 2017; Barberá and Sood 2014). Yet other times, laziness explains what we consume. For instance, merely changing the position of the channel on the menu affects what we consume (Martin and Yurukoglu 2014). These limitations mean that there is often a sizable gap between people's ideal points and the ideal point of what they consume.

However inexpertly and desultorily, people try to choose what maximizes their utility. Except what gives people utility in the moment often differs from what gives utility after having had the chance to reflect (Akerlof and Shiller 2015). In the moment, people may want to be entertained. On reflection, they may want to be improved. So in the moment, they may pick burgers. And on reflection, kale.

For most people, most of the time, less considered goals likely dictate consumption. Confining ourselves to decisions about decisions about consumption of political information,

interest in politics, interest in partisan (or ideologically) congenial information, and interest in accurate information contribute a great deal to the utility. Aside from these, people have preferences about style. For instance, satire over hard news, or video over text. People also prefer learning about some issues more than others (see for e.g., Iyengar et al. 2008). For instance, old people likely prefer reading news about Medicare than student loans; immigrants, news about their home country to another country; the young, news about student loans than Medicare.

Besides these, there are other more widely shared preferences. People prefer negative information (Trussler and Soroka 2014). And they prefer important information, however construed. This isn't an exhaustive inventory. But these aspects are typically what people have information about when they are deciding on what to consume.

Preferences vary by context. For instance, even those who habitually abstain from news likely have eyes glued to the news when a terrorist attack happens. By the same token, as we get closer to the day of the election, people consume more political information (Gentzkow and Shapiro 2011; Garz et al. 2017). Preferences also evolve with time. For instance, our current affairs knowledge peaks around middle age (see Appendix A), suggesting that we pay greatest attention to news then. By the same token, which issues we find interesting depend on where we are in life.

Not only are preferences mutable, they also vary across people. The taste for political information varies *immensely*. At one end are those who live and breathe politics, keeping track of every latest poll. At the other, much deeper, end are those who couldn't be bothered with knowing which party holds a majority in the House. (Only 47% of the people know the fact (Bawn et al. 2012).) Similarly, the taste for congenial political information varies considerably (see, for e.g., Iyengar and Hahn 2009).

In toto, preferences for consumption of political information are complex, variable, and mutable. And given this richness, we need to make some choices about what to explore in

greater detail. Given the focus in previous research, we opt for exploring preferences for political information and partisan congenial information. On these topics, we focus to conceptual issues and methodological problems around measurement of preferences, their correlates, and their effects on important political variables. In particular, we rethink what we want to ideally measure, bring greater clarity to the consequences of compromises in measurement that we often make, and clarify interpretation of some widely used measures.

A Preference for Entertainment

Like many things in life, you need a trifecta to learn about politics. First, you need the opportunity. Second, when given the opportunity, you need to be interested in consuming political information. And third, you need the ability to process the information you consume (p. 335, Luskin 1990). Differences in how much people know about politics, thus, rest on differences in supply (opportunity) and demand (means and motives).

Till a quarter a century or so ago, consumption of political news depended a shade less on how interested people were in politics. During times of the day when most people were at home and seated in front of their televisions, there was no other programming on television except for the news. And rather than turn off the television and wait for the next sitcom, some people sat through the news (Robinson 1976). Though the captive audience's interest in news was likely low, it likely absorbed some information (Keeter and Wilson 1986; Krugman and Hartley 1970; Zukin and Snyder 1984). For "mere exposure produces learning" (pg. 114, Graber 1998).

Today, the information environment is very different. Those disinterested in news can find alternatives more easily. Interest in politics, thus, likely plays a somewhat larger role in how much political information people consume.

Interest in politics is often founded in differences in taste (Luskin 1990; Prior 2003;

2007; Iyengar and Hahn 2008; Prior 2003). Taste in politics forms early and is stable through life (Prior 2010). Aside from taste, interest in politics is also shaped by its intrinsic and instrumental value. Some like to stay informed because it helps them vote 'correctly' (Shineman 2012). Others, because their acquaintances value such information in conversations (Sood 2014; Genova and Greenberg 1979).

Neither intrinsic (taste based) nor instrumental value of political information is sufficiently high for most people to consume much public affairs programming. Flaxman, Goel and Rao (2016) analyzed passively collected browsing data from 1.2 million Americans. They found that just 4% of the people read 10 or more news articles and 2 or more opinion pieces in a 3 month period. Analysis of 10 million self-identified partisans on Facebook also yielded grim results. Articles about national news, politics, and world affairs make up just 13% of the shared articles (Bakshy, Messing and Adamic 2015).

Offline, things are no different. Less than 8% of Americans tune into network news regularly, and less than 1% watch cable news regularly (Prior 2009). Rather than watch public affairs programming, Americans consume entertainment. In 2011, according to Nielsen, Americans spent just 9.6% of the time they spent watching television on watching news. They spent 15.5% of the time watching television on reality television, 11.4% on sitcoms, 22.5% on sports, and 41.1% on drama.

But these bleak numbers are at odds with the much rosier numbers from conventional surveys. For instance, 75% of Americans say they read news at least daily in some form. The numbers conflict because people lie or misremember in ways that makes them look good. Such biases in responses bias estimates considerably. For instance, survey estimates of audience for network news are inflated by nearly 300% Prior (2009).

Even those who prefer news over entertainment, do not always choose news with adequate nutritional value. Instead of news about major political leaders, major issues, and significant events, people often prefer more personality-centric, episodic, and sensational news

(Patterson 2000). According to Nielsen, in 1999, soft news was about as popular as network news Prior (2003). Unsurprisingly then, Americans know more about celebrity affairs than public affairs. They correctly answered 80% of the questions about entertainment versus 57% of the questions about domestic politics and 40% of the questions about international politics (Curran et al. 2009). In Denmark and Finland, however, countries with much stronger public broadcasters, citizens were as informed about public as celebrity affairs.

In all, it appears that Americans, on average, consume little public affairs programming. But that conclusion is likely too pessimistic. For one, no published research that we know of aggregates viewership across all media. Today, people have access to news 24 hours a day, on smartphones, tablets, and television. And tallies on a single device give but a sliver of the total consumption. For two, much of the published research ignores audiences of local news, which are the largest. For three, little effort has gone into describing the volume of ad hoc querying about politics on search engines (though see, **?**). Today, some people likely do not feel the need to go to conventional news sources, aware that they could simply google it if they need itSparrow, Liu and Wegner (2011). All these concerns make inferences about news consumption based on over time changes in consumption on one medium suspect. We delve into these points,and others in greater detail later in the chapter.

Debates about strength of preferences for political information and the amount of political information that people consume, however, are only material to the extent to which they explain conceptually subsequent, politically important variables. Of the many politically important attitudes and behavior that preference for political information explains—political knowledge, voting, 'correct' voting, etc.—the theoretical case linking consumption of political information to knowledge is perhaps the most straight forward. We expect the number of bits of political information (of a certain quality) that people consume to strongly affect what people know about politics. If people prefer consuming information about a particular topic (Iyengar 1990; Iyengar et al. 2008), we can further refine this generic claim to: total con-

sumption of bits of information about a particular domain will affect what people know about that domain of politics. If still not satisfied with the precision of the statement, we can reason backwards to a near tautology. People know what they learn, a combination of what they are exposed to, what they attend to, what they process (and how they process), and what they care to remember.

Studies estimating the causal impact of hard news preferences on consumption of news and knowledge, however, have been hard to come by. Perhaps because political interest is largely stable, with even high school and college education playing at best a marginal role (Prior 2010). Even so, interest in political campaigns does vary, and exogenous factors influencing it can be exploited to estimate impact on political knowledge and political participation.

Hitherto, however, most of the work has taken preferences as fixed and tried to estimate the impact of changes in information environment. For instance, some research has tried to identify the impact of coverage of local newspapers on knowledge about local representatives, by using discontinuities in newspaper distribution areas (Snyder Jr and Strömberg 2008). Some other research has tried to exploit cross-national variation in institutions. (Curran et al. 2009) find that Americans know more about celebrity affairs than public affairs, answering 80% of questions about entertainment correctly versus 57% of domestic hard news questions, and 40% of international hard news questions. Whereas, the Danes and the Fins were equally informed about public and celebrity affairs. This kind of research begs obvious questions about the sources of variation. For it could be institutions, people or some mix of the two. A better way to identify the effect of institutions perhaps would be to compare differences between "current affairs knowledge" (for a discussion about normative importance of surveillance knowledge, see Graber (2004); Leighley (2003); Lupia and McCubbins (1998); Schudson (1998); Zaller (2003)) and civic knowledge, using civic knowledge to difference out personality level factors.

The impact of large over time changes in the information environment on consumption

of political information and other consequent variables has, however, been considerably harder to pin down. Partly because identification of changes in consumption of political information in presence of substitutes, variation in quality, and when limited to data on only a few media, is a hard problem. The most prominent of these attempts, by Gentzkow (2006), exploits exogenous variation in introduction of television to estimate the effect of turnout. The study finds that 25-50% of the total decline in turnout since the 1950s can be pinned on television. The study attributes the decline to lower informativeness of television vis-'a-vis newspapers. Thus, introduction of mass media, with its limited prime-time menu, that purportedly created an inadvertent audience for news, reduced consumption of public affairs (c.f. Prior 2007).

Continuing with this downward over time trajectory, Prior 2007 posits that introduction of cable further reduced turnout, with the effect mostly concentrated among those with little interest in politics. More generally, Prior 2007 posits that the inequality between the less and the more politically interested would increase.[1] To investigate one natural implication of the point—the 'knowledge gap' between the less and more educated will increase—we decided to plot the difference between interviewer assessed knowledge of respondents[2] with high school or less education and college degree or more using data from the American National Election Studies. As Figure 1 suggests, the difference has been *declining,* though very slightly. (Correlation with political interest is also decreasing slightly over time.)

In all, there are reasons to be skeptical about the new conventional wisdom about the consequences of change in the media environment on how much people know, and how the information is distributed. As Lelkes, Sood and Iyengar (2015) show, some new technologies—in their case, access to broadband—can lead people to consume *more* news programming online.

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[1]Differences between what the less and the more politically interested know cannot be be simply attributed to who the politically interested are. Research suggests that political interest is a stable trait, formed early in life (Prior 2010). However, demographic changes can potentially explain such changes.

[2]Interviewers were asked to rate "Respondent's general level of information about politics and public affairs" on a five point scale ranging from "Very High" to "Very Low." See Zaller (pg. 333-344, 1992) for discussion on why interviewer assessed political knowledge is a good measure of political knowledge.

But more fundamental questions about how transition to new media has affected people and politics remain. And a key reason behind why some critical unanswered questions is implicit measurement challenges. We discuss some of those challenges later in the chapter, describing theory and evidence for preferences for congenial political information next.

A Preference for Congenial Political Information

More slanted news can increase the instrumental value of news. That is, more slanted news can increase a consumer's expected utility from a choice the news provides information about. In general, models behind such hypotheses can be interpreted as examples of the broader

Figure 1: Average Difference Between Interviewer Rated Knowledge of Respondents with High School or less education and College and more.
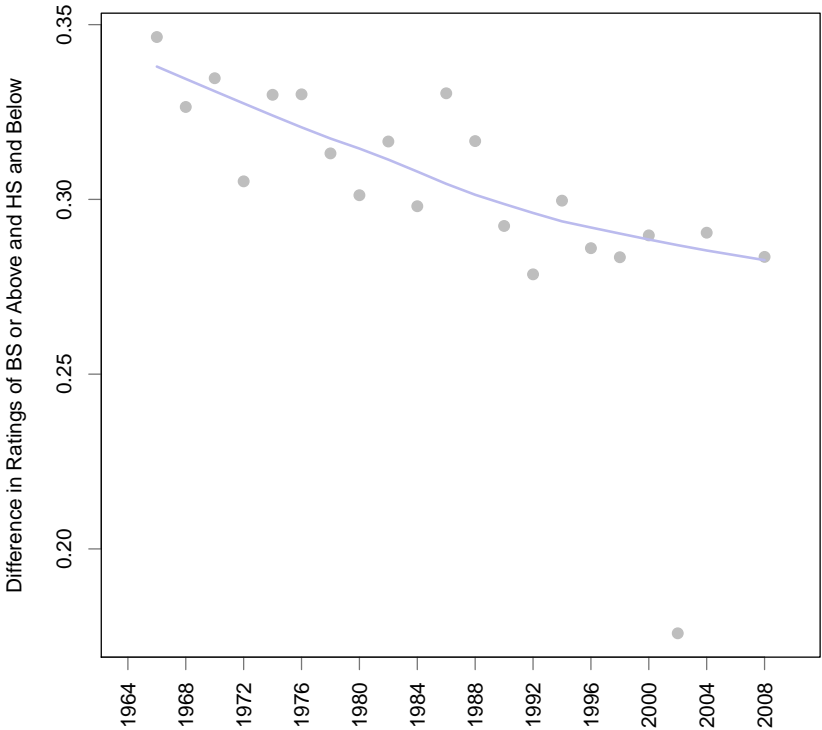
literature on delegation and advice. Just as a decision-maker is better off being advised by, or delegating a decision to, an agent who shares the decision-maker's preferences, a news media consumer may be better off getting news from a media outlet with similar political "values."

Most scholars assume that preference for congenial political information can be driven by either motivation to be accurate, or motivation to avoid dissonant information (Garrett 2009, although see Metzger, Hartsell and Flanagin 2015). Untangling the effects of these motivations on media consumption is fairly difficult, as dissonance causing information is also perceived to be less accurate. In a study on "attitude polarization," Lord, Ross and Lepper (1979) found that people tend to find academic work which reaches conclusions that are congenial to their prior attitudes to be more credible than research that reaches conclusions that are uncongenial. Therefore, we cannot uniquely interpret preference for news stories from congenial sources as preference for congenial information (Iyengar and Hahn 2008). They could be choosing Fox News because they see it as accurate, or because they don't want to learn about ways in which more conservative policies may be harming the country.

The relationship between perceived accuracy and congeniality is clear when we ask people to indicate how accurate various news outlets are. In a survey that we conducted jointly with Shanto Iyengar in 2011 on the YouGov panel, we asked 1000 respondents to place a variety of news organizations on a scale ranging from Liberal (1) to Conservative (7), with the midpoint indicating 'No bias at all' (see also, Lelkes, Iyengar and Sood 2013). The means and 95 percent confidence intervals for the perceived bias of these organizations appear in Figure 2. The results indicate that purportedly liberal organizations like the *New York Times*, NPR, and PBS, are on average rated as nearly unbiased by Democrats. Meanwhile, many Republicans see purportedly conservative organizations like Fox News, the Drudge Report, as less biased than other organizations. Though note that independents rate all news organizations except for Fox News, Drudge Report and Wall Street Journal as left of center.

To parse the extent to which selection is driven by congeniality than by perceived accu-

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racy, we need a measure of ideological distance between a person's ideal point and the ideal points of the outlets, and a measure of perceived accuracy. We can then regress choice on ideological distance and perceived accuracy to assess how much each contribute to why people select. That perceived accuracy and perceived ideological distance may be endogenous is immaterial, for perceptions are the causal quantities of interest. Another, simpler, way of estimating the extent to which the news selection is ideological, than driven by trust is by exploiting the fact that judgments about trust and accuracy are generally made about media sources than about news stories. Thus, a measure can be built using revealed preferences over a series of choice tasks in which congeniality of the stories, and the sources to which they are attributed to is manipulated.

Regardless of whether consumption of partisan media is driven by trust or taste, on average, people tend not to consume much partisan media (Prior 2009; Gentzkow and Shapiro

Figure 2: Perceived Bias of News Organizations by Party Identification
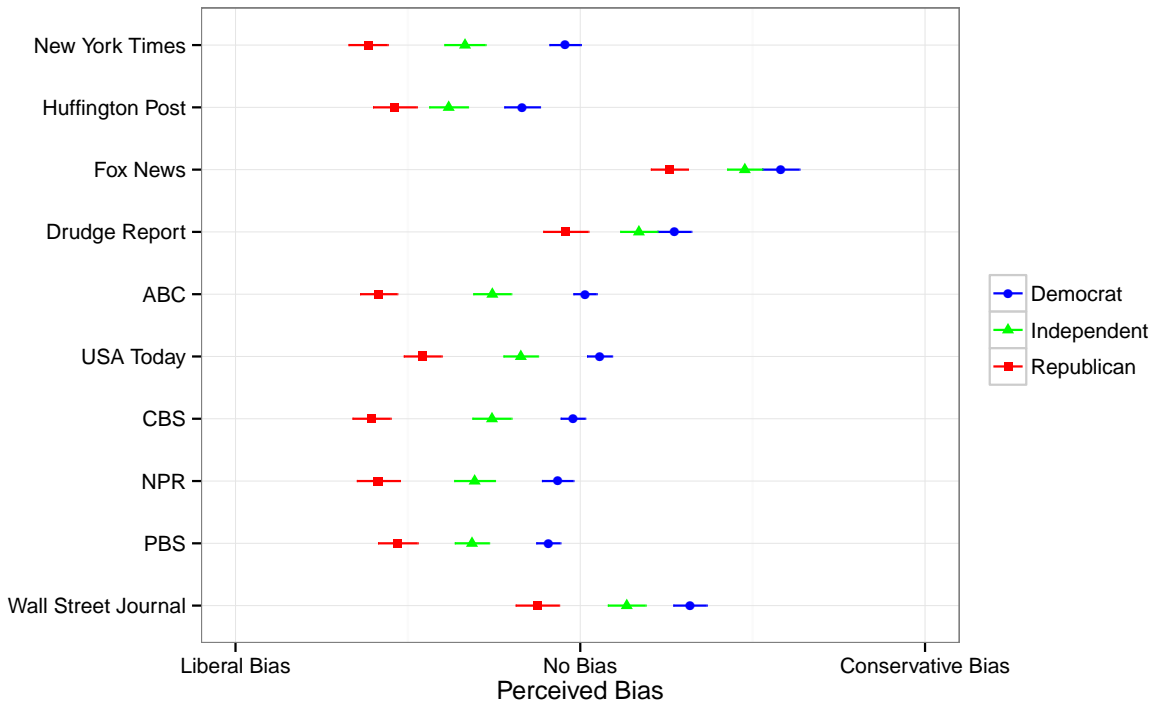
2011). Underneath modest average, however, hides considerable variation. For instance, an overwhelming majority of the readers of the partisan blogs—many of these blogs tend to be rabidly partisan; for instance, they rarely link to content on the other side (Adamic and Glance 2005; Hindman 2008)—lean the same way politically as the blog (Lawrence, Sides and Farrell 2010). As Lawrence, Sides and Farrell (2010) summarizes, "blog readers appear highly polarized ... and are very nearly as polarized as U.S. Senators" (p. 141, Lawrence, Sides and Farrell 2010). More generally, strength of partisanship is correlated with preference for partisan congenial information (Garrett 2009; Iyengar and Hahn 2008).

Some evidence corroborates the rough template of selection that we have laid out above. For instance, the politically disinterested sometimes opt for entertainment than news (Prior 2005; 2007). Of course, that may be no escape from partisan news. Partisan cable channels, undoubtedly aware of consumer demand for soft news and entertainment, have radically altered their programming to meet the demand. Fox News Channel, for instance, has established a niche for sports coverage, meanwhile MSNBC specializes in late-night crime programming, and Huffington Post is one of the major sources for coverage of Hollywood and celebrity life. This gives particular teeth to evidence that suggests that people may prefer to consume both hard and *soft* news from partisan congenial sources (Iyengar and Hahn 2008).

As part of a larger study, findings from which we discuss through the paper, we collected some data that allows us to present some addition evidence on preference for getting both soft and hard news from partisan congenial sources. In particular, in 2013, we surveyed 2000 participants that were recruited from the YouGov panel. Like Iyengar and Hahn (2008), we randomly assigned a set of identical news stories—both hard and soft— to different sources, and asked participants to select the story they were most inclined to read. We told the respondents that the investigators were developing a new way of displaying online news, and that they were to select one story to read from a set of six stories displayed on their computer screen. The screen layout followed the format of Google News, and a Google News logo appeared in

the upper left corner. Story headlines and associated source images were displayed in two rows, each with three headlines; we randomized the position of individual stories within each screen. Participants completed four rounds of the source selection task.

The full set of 24 stories (4 screens each with six stories) included an equal number of hard and entertainment news reports. The former included stories on electoral politics and the economy. Entertainment news stories focused on celebrity life, sports, movies, and sleep disorders. A source logo was randomly assigned to each story. The first and third trial provided logos corresponding to news organizations, e.g., Fox News. The second and fourth trials matched stories with both a television network and a prominent news personality from the network, e.g., The O'Reilly Factor (Fox). All four trials featured two left-leaning sources, two right-leaning sources, and two non-partisan sources. (See Appendix B for screenshots of how the story selection screens looked.)

Data suggest that partisans select entertainment stories from partisan congenial sources at virtually the same rate at which they selected hard news stories from the same type of outlets (see Figure 3). In particular, both Republicans and Democrats selected both hard and news from congenial outlets 10% more often than from uncongenial outlets.

Data are also consistent with results from other studies that conclude that Republicans prefer information from congenial sources more than Democrats Garrett (2009); Iyengar and Hahn (2008). Republicans chose right-leaning sources twice as often as left-leaning sources— 50% versus 22%. However, there are a couple of reasons to not interpret these results as conclusive proof that preferences for information from congenial sources are stronger among Republicans than Democrats. Firstly, all the studies treat MSNBC and Fox interchangeably— Fox is taken to be as right of center as MSNBC is to the left. They aren't (Barberá and Sood 2014; Martin and Yurukoglu 2014). Secondly, Fox has been consistently right of center for a much longer time than MSNBC has been left of center (Martin and Yurukoglu 2014) and thus is likely to have greater recognition than MSNBC.

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However much people may prefer information from partisan sources, it does not mean that consumption of information from these sources will have large effect on people's attitudes and behaviors. In particular, there are two good reasons for thinking that consumption of information from partisan outlets may only have modest consequences: a) the difference between

Figure 3: Patterns of News Selection by Slant of Source
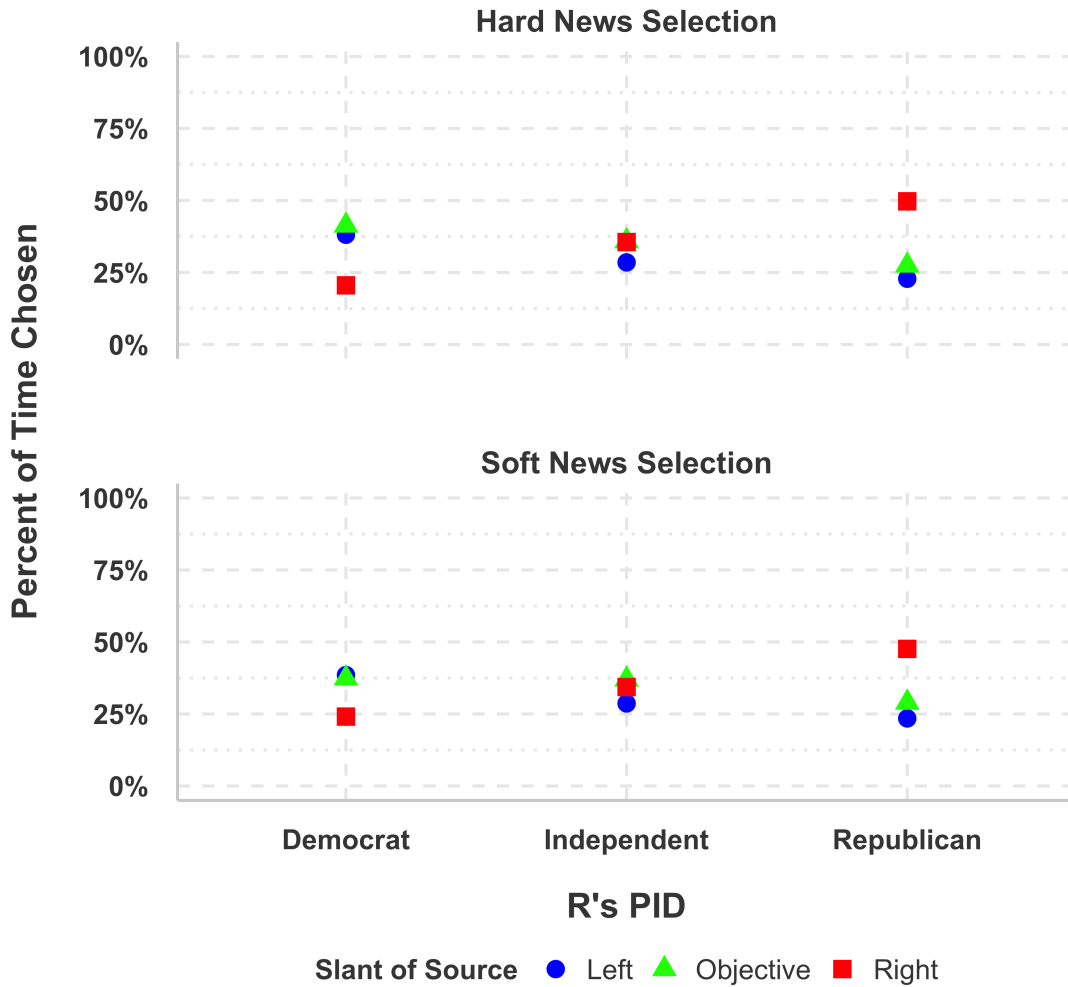
positions of partisan media and the consumer is smaller; there is just less room to move (Bennett and Iyengar 2008) and b) partisans may be aware of the biases, and may appropriately down weight what they hear from different media sources.

Neither of the reasons are compelling. A great deal of research shows that much of the American public holds moderate policy positions on most issues (Fiorina, Abrams and Pope 2005; 2008). And many media organizations are more ideologically extreme than the median Republican or Democrat (Barberá and Sood 2014). The evidence is also overwhelming that people cannot estimate bias appropriately (see Figure 2).

Thus, we expect net consumption of congenial over uncongenial bits of information to affect politically important variables like partisan affect, what people know, their positions on issues, trust, whether or not people vote (participate in other ways, e.g. donate, attend a rally etc.) and whom they vote for (e.g., Stroud 2010; Levendusky 2013; Arceneaux, Johnson and Murphy 2012; Melican and Dixon 2008; Martin and Yurukoglu 2014). Presumably, the amount to which the discrepancy makes a differences is conditioned by prior stores of knowledge (Zaller 1992). For instance, those with little knowledge may be easily swayed by small discrepancies in consumption. And the bare stores of political knowledge of an average American may explain why research suggests that small changes in people's media diet matter (DellaVigna and Kaplan 2007; Martin and Yurukoglu 2014).

More nuanced arguments can be articulated. For instance, exposure to media that espouses an uncongenial position may also polarize. A Democrat watching Fox News Channel may walk away thinking that the information being broadcast is defamatory and hateful, and that people who typically watch Fox News Channel (and a Democrat may think all Republicans habitually watch it) are complicit in this misinformation and defamation campaign.

Hitherto, we have assumed that the effects of media are limited to the people who consume it. But that is almost certainly wrong. A long literature in Communication expands on the 'two-step' flow (Katz 1957). And in an era where technology for sharing information has

never been easier, it is likely that the consumption also affects the attitudes and preferences of people who interact with people who consume partisan media. In one recent study, Druckman, Levendusky and McLain (2015) exposed random subsets of participants to partisan news and then group all subjects in randomly composed discussion groups. They find that the effects of partisan news had an effect on the attitudes of those who were not exposed to partisan media.

Measurement

Both preferences and behavior are worth studying. Often, however, we have access to nothing more than imprecise measures of behavior, be they self-reports, or passive observations of actual consumption, but through some narrow porthole, e.g. data from the Bing toolbar in Flaxman, Goel and Rao (2016). And judgments about preferences based on such data rest on some heroic assumptions. Add to these issues, rapidly changing technology. How do you measure consumption when the number of devices on which people consume keeps increasing? How do you create commensurable over time measures?

The conventional estimand for preference for and consumption of public affairs is $\frac{\text{Total political information cons}}{\text{All information consumed}}$ For 'partisan selectivity', it is $\frac{\text{Total congenial information consumed}}{\text{All political information consumed}}$. As a result of Garrett 2009, another corresponding ratio was added: $\frac{\text{Total uncongenial information consumed}}{\text{All political information consumed}}$.

Aside from the usual caveats that go into inferring preferences from consumption, it isn't clear if the ratios are appropriate conceptualizations for all dependent variables. If the dependent variable is, say, partisan affect, it may not matter how 'selective' one is but the net imbalance in consumption—difference between the number of congenial and uncongenial bits consumed (Lelkes, Sood and Iyengar 2015). For instance, someone who consumes 5 conservative units and 10 liberal units is, by some measures, as selective as someone who consumes 50 conservative units and 100 liberal units of information. If the two hypothetical people start with the same partisan affect and knowledge, the impact of consuming 50 more liberal

units of information is very likely different than the effect of consuming 5 more liberal units of information.

A yet more unequivocal case can be made for political knowledge. If we want to predict political knowledge (after regressing out political interest), surely, it is the total bits of political information consumed that is a more appropriate right-hand side variable than proportion of media consumption that is news. More generally, the trouble with normalizing is that we assume people consume similar amounts of total (political) information. They don't. To our point, the Finns and the Danes know *more* about *both* celebrity affairs and public affairs than their US counterparts (Curran et al. 2009).

Whatever the estimand, to estimate it, we need to make a series of compromises, and keep track of the various ways inferences are affected by the decisions we make. Ideally, we would like to track all the information consumed, precisely measure ideology of each unit of information, and, on the same scale as ideology of information, the ideology of the consumer. We could then look at the amount of, and the distribution of the ideology of the information consumed. If we so wanted, we could also summarize various moments of the distribution of ideological distances for each person. And if we were worried about dimensionality of ideology, we could do the same by issue area. But such granular data are hard, if not impossible, to get. And given the limitations, scholars have made a host of simplifying assumptions about each of the components of the measure. For a more systematic look at assumptions behind current measures, we deal with assumptions about measurement of ideology, and consumption independently. Comparing the measures we have to measures we would like to have illuminates how the current measures fall short.

Measurement of Ideology

The modal study on selective exposure makes three decisions about measurement of ideology. It judges ideology at the outlet level. For instance, it makes judgments about the ideology

of Fox News, *The New York Times*. It takes ideology of outlets as self-evident, skipping formal measurement all together. And it makes categorical judgments about ideology—liberal (Democratic leaning) or conservative (Republican leaning). (See for instance Iyengar and Hahn 2008; Stroud 2010; Levendusky 2013; Garrett 2009; Knobloch-Westerwick and Meng 2009.) Each of the decisions has its attendant problems.

Making judgments at the level of outlet means measuring the first moment but not higher moments. There is mean, but no variation. Or skew. Coding all the bits of information as having the same ideology seems unwise. The variance in ideological positions within outlets is sizable (Barberá and Sood 2014). For instance, we know that a column by David Brooks is likely to the right of Paul Krugman's. In fact, many of the articles on New York Times are not even political news (Sood and Lelkes 2015). A toy example of how such measures can mislead. Say a Republican only visits http://foxnews.com and http://nytimes.com, visiting each 10 times. Selective exposure, based on the conventional estimand— number of visits to Fox News divided by total site visits—would be $\frac{10}{20}$. If, however, Fox News actually had 7 stories that were conservative and 3 that were liberal, while the *New York Times* was balanced (5 liberal and 5 conservative), the correct estimate of selective exposure is $\frac{7}{20}$.

Secondly, subjective estimates of ideology are open to critique, especially when accusations of slant are vigorously contested. More generally, lack of objective measures leaches credibility from the claims, and makes them, unscientific. Thirdly, making coarse judgments generally means losing a lot of important information. And that potentially reduces analysts' ability to learn. For instance, if we only make crude judgments about the ideology of a bit of information—it is a Republican-leaning or Democratic leaning—for a Republican at a 6 on the conventional 1 to 7 liberal to conservative scale, consuming a bit of information at 5 (less conservative than the respondent's ideology) will be treated the same as consuming a bit of information at 7 (more conservative than the respondent's ideology).

Aside from these problems are debates about how to measure ideology. One set of

studies measure slant using audience ratings of slant. For instance, Dilliplane (2011) uses data from the 2008 National Annenberg Election Study that asks respondents which outlets they use for information about the campaign, and then asks them whether the outlets they report using favor one presidential candidate or another. She then codes outlets as left-leaning if 25% or more of viewers rate it as favoring the Democratic candidate, right-leaning if 25% or more of viewers rate it as favoring the Republican candidate, and neutral otherwise.

The audience rating based measures have three crucial weaknesses: subjectivity, arbitrary thresholds, and crudeness of judgments. Firstly, the measure is still subjective—it merely replaces researcher bias with audience biases. A long line of research suggests that people tend to think that media that support their argument are unbiased (Morris 2007; Vallone, Ross and Lepper 1985, e.g.,).[3] (See also the Figure 2.) Secondly, it isn't clear how the 25% threshold was decided. Thirdly, coarseness of judgments means, for instance, coding both, *Good Morning America* and *Countdown with Keith Olbermann* as just left of center. This in turn means coding someone who only watches Olbermann as selective as someone who only watches *Good Morning America*.

Some others studies define a utility function for consumer decision to consume media to estimate ideology or more straightforwardly use proportion of partisans in audience as a measure of slant (Van Kempen 2007; Goldman and Mutz 2011; Flaxman, Goel and Rao 2016; Gentzkow and Shapiro 2011; Barberá and Sood 2014). For instance, Flaxman, Goel and Rao (2016) define an outlet as conservative if more than 50 percent of its audience supports the Republican candidate, and liberal if less than 50 percent supports the Democratic candidate. This method is reasonable if we assume that outlets slant their output based on the priors of the audience (Gentzkow and Shapiro 2010) or the audience chooses an outlet based on its

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[3] Dilliplane (2011) uses ratings from Independents to try to address this concern but there are at least a couple of problems with doing so. Firstly, Independents tend to be less well informed and their judgments are liable to be less reliable. Secondly, describing oneself as independent doesn't mean that they are objective observers without policy preferences.

priors. If our goal is to measure the prevalence of selective exposure, the method stacks the deck a bit.

Another set of studies use a variety of content-based measures to assess the ideology of the media (Gentzkow and Shapiro 2010; Groseclose and Milyo 2005; Ho, Quinn et al. 2008; Sood and Guess 2015, see for instance,). Groseclose and Milyo (2005), for instance, track the number of times media outlets and lawmakers cite liberal/conservative think tanks, and give the media outlets the ideal point of the legislator whose citation patterns they most resemble. However, Gasper (2011) finds that media bias scores of Groseclose and Milyo (2005) are sensitive to the dates and the think tanks used in the analysis.

A number of scholars classify newspaper editorials as liberal/conservative based on whether they endorse one party's candidate or the other, and whether they endorse the position of the Supreme Court's liberal or conservative wing (Ho, Quinn et al. 2008; Puglisi and Snyder 2015). Editorials, however, occupy only limited space within newspapers, and may not bear much resemblance to the overall tone of the newspaper. For example, *Wall Street Journal's* editorial section is well to the right of the news section (Barberá and Sood 2014).

Yet other scholars exploit what issues are covered to estimate ideology. The scholars exploit the fact that parties 'own' certain issues—people hold stereotypes about which party is better at handling certain issues (Petrocik 1996; Egan 2013) to scale media. One prominent attempt of scaling news is using the idea is by Larcinese, Puglisi and Snyder (2011), though in many places the paper reduces to analyzing how the issues are covered, focusing for instance on whether negative economics is highlighted more when Republicans are in the White House or not. Exploiting only information about what issues are covered suffers from one more problem. Biases in what issues are covered can be poor proxies for ideological bias if the media's agenda is dictated by prominent real world events, e.g. the Iraq War, and the congressional agenda.

Lastly, some studies use congressional speech as 'training data' to estimate a model between aspects of congressional speech and ideology and use it to predict ideology of the

news (Gentzkow and Shapiro 2010; Sood and Guess 2015). There are at least three problems with such analyses. Firstly, the words used by the congress aren't the same as used by the news. And correlation with ideology within training data (congressional corpora) is liable to be higher than correlation with ideology in out-of-sample test data (news transcripts). Secondly, performance within training data is poor. For instance, the r^2 of models of text and congressional ideology are no greater than .7 (see, for e.g., Barberá and Sood 2014; Gentzkow and Shapiro 2010). And within party r^2 of models is generally only half as large (Barberá and Sood 2014). Thirdly, the methods make strong judgments about overlap in time between congressional speech and news. This, in turn, relies on assumptions about overlap between congressional and news media agenda.

Measurement of Consumption

Once we have a media source's ideal points, we next need to track consumption. And again, a variety of concerns apply. We discuss concerns around the two main ways media consumption is measured: passive tracking of information consumption and survey measures.

Browsing Data

Rather than track all information, researchers often limit themselves to measuring just political information. This means ignoring consumption of popular television shows like, *The Good Wife*, *The Big Bang Theory*, and *The Family Guy*. But doing so assumes that entertainment shows don't affect political attitudes. However, such an assumption is unwarranted. Decades of work on cultivation theory (e.g., Shanahan and Morgan 1999) suggests that many of our attitudes on crime, authority, social welfare, etc. come from exposure to entertainment television (Morgan and Shanahan 1991).

To shed more light on ideological content of entertainment shows, we used data from the National Annenberg Election Study (NAES) to estimate the ideology of various entertain-

ment shows. In particular, using a similar strategy to Flaxman, Goel and Rao (2016), among all self-identified partisans who indicate watching a particular entertainment show, we tallied the proportion that identified as Democrats. As Figure ?? suggests, there is fair amount of variation in partisan composition of the audience of various shows. We contend that the variation in part reflects ideological content of the shows. More generally, we contend that we may want to take account of exposure to 'entertainment shows' when modeling impact of media on people's policy preferences and behaviors.

Even if we limit ourselves to political information, the domain is still not clear. Is news about a bank robbery relevant political information? What about Hillary Clinton's haircut? Given the ambiguity, when using browsing data, scholars rely on ad hoc lists of domains to estimate consumption of certain kind of media. For instance, Flaxman, Goel and Rao (2016) write,

> We select an initial universe of news outlets (i.e., web domains) via the Open Directory Project (ODP, dmoz.org), a collective of tens of thousands of editors who hand-label websites into a classification hierarchy. This gives 7,923 distinct domains labeled as: news, politics/news, politics/media, and regional/news. Since the vast majority of these news sites receive relatively little traffic, to simplify our analysis we restrict to the one hundred domains that attracted the largest number of unique visitors from our sample of toolbar users. This list of popular news sites includes every major national news source, well-known blogs and many regional dailies, and collectively accounts for over 98% of page views of news sites in the full ODP list (as estimated via our toolbar sample)

Using these lists to estimate consumption raises three obvious concerns. First, there is the danger of treating a non-news site as a news site. Second, there is a danger of missing some news sites. And third, even sites classified as news sites, such as nytimes.com, carry a lot

of apolitical news.

Lists like those published by DMOZ seem curated well-enough to not contain too many false-positives. The real question is about how to calibrate false negatives. Here's one proposal. Take a large random sample of the browsing data. Compare it to a large comprehensive
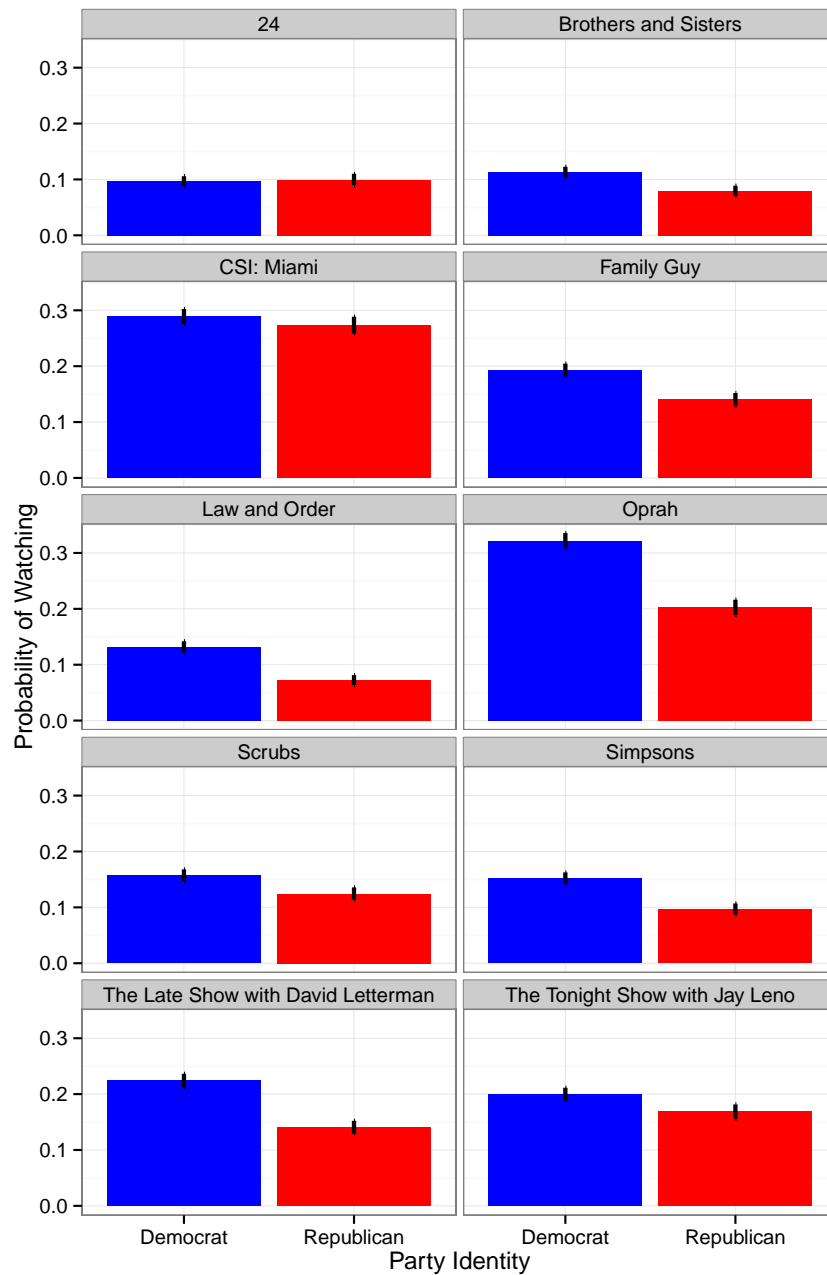
database like Shallalist. For the domains that are not in the database, query a classification service such as Trusted Source. The initial step of comparing against Shallalist is to reduce the amount of querying. Use the results to estimate the proportion of missing domain names. The total number of missing domain names is likely much much larger. Also estimate missed visitation time, page views, etc.

We can address the third concern by exploiting the URL structure. Many news include semantic information in the URLs. For instance, a sports story will often have a URL with "/sports/" in it. Flaxman, Goel and Rao 2016; Bakshy, Messing and Adamic 2015 use this to categorize content. Both assume the classifier to be perfect. But it likely isn't. False positive and negative rates for this kind of classification can be estimated using raw article data.

If the measure of ideology is continuous, there are still some risks. If we code all page views as mean ideology of the source, we assume that the person views a random sample of pages on the source. (Or some version of that.) But that is too implausible an assumption. It is much more likely that a liberal reading the NYT likely stays away from David Brooks' columns. If you account for such within source self-selection, selective exposure measures based on source level coding are going to be downwardly biased—that is find people as less selective than they are.

Survey Data

On surveys, concerns about granularity and truncated and biased choice sets are greatly exacerbated. No one expects people to wade through long lists of sources and accurately report use. Research corroborates this intuition. People cannot remember how much time they spent watching a particular show last week (Prior 2009). The corollary to the previous point is that trusting users to keep a diary to accurately record their media consumption is a reverie only Nielsen is happy to engage in.

Hence, most survey measures of media consumption carry only a small number of salient

options. Even the list in Dilliplane, Goldman and Mutz (2013) carries only the most popular shows on television. To generalize from measures with a truncated choice set, there should not be any sampling bias. The skew towards salient news sources in most survey media consumption batteries is thus problematic. It will yield biased estimates if people are more (or less) selective about less mainstream political sources. For instance, if people went to mainstream news sources to get the information, and to less mainstream sites carrying sympathetic interpretation for opinion about the facts, we would underestimate partisan selectivity on conventional sources.

The bigger problem with survey batteries of media measures is that the choice set doesn't represent the domain well. Some measures, for instance, include a media battery with equal proportions of conservative, liberal, and 'neutral' news sources (see, for e.g,, Iyengar and Hahn 2008; Knobloch-Westerwick and Meng 2011; 2009) . The true composition of the domain is likely closer to a bulk of choices being at or near the center, with only a few outlets with clear ideological slants.

To infer preferences in real life, the truncated choice condition needs to be true to the composition of the domain. Inferences from truncated and biased choice sets can at best recover noisy ordinal rankings.

The other problem with survey measures is expressive responding (Prior 2013). Republicans may report that they watch Fox News, not because they do, but because they want to signal that they consume news that is consistent with their self-identity. By the same token, Democrats may be averse to acknowledging that they consume Fox News.

Such features likely explain why preferences for partisan media uncovered in survey data are much stronger than obtained by passive tracking data. Data from passive tracking suggests that the partisan overlap in audiences of major explicitly partisan sources is considerable (Gentzkow and Shapiro 2011; Guess 2016).

Given the problems, rather than use survey reports, some scholars have tried to im-

pute preference for news from congenial sources based on a small number of experimental choice trials (see Iyengar and Hahn 2008). The choice experiments keep the news stories the same but change the news source. And impute preferences from the choices people make. This behavioral measure suffers from some of the same problems as the conventional survey measures—small biased choice set. Additionally, because of a small number of trials, the measure also tends to be noisy.

Using data from the YouGov study, we gauge sthe reliability of measures of preferences for partisan congenial news sources using a small number of trials. Like Iyengar and Hahn (2008), we randomly attributed the same hard and soft news stories to different sources, and asked participants to select the story they were most inclined to read. Using the design, we obtained results consistent with previous research Iyengar and Hahn (2008).

To test the reliability, we measured the correlations between trials. The correlations between trials are alarmingly low. The polychoric correlation between congeniality of the chosen source (coded as congenial, neutral, or uncongenial) between any two trials range between .06 to .20. And the correlation between choosing hard news in any two trials is between -.01 and .05.

To probe the validity, we calculated correlations with indicator variables. Preference for congenial news is unrelated to the preference for soft news ($r = -.05$). (See Appendix B for the operationalization of these measures.) This is puzzling. We expect those who prefer political news to prefer congenial news more Iyengar et al. (2008). In fact, self-reported news interest, while more strongly correlated with a preference for congenial news than the latent measure ($r = .21$), was still only moderately correlated with the latent trait model based on manifest choices ($r = -.36$). Similarly, the correlation between political knowledge and preference for congenial news was $r = .21$, while the correlation between political knowledge and preference for soft news was $r = -.36$. In fact, the correlation between political knowledge and self-reported news interest was much stronger ($r = .59$). This suggests that latent trait models

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based of interest in news based on small number of choices are less valid than self-reports.

Measurement of Consequences

Until now, the main focus of research on consequences of selective exposure to partisan media has been ideological polarization and vote choice (e.g., Stroud 2010). Exposure to partisan media, however, can sometimes cause people to hold ill-will towards the other party, without meaningfully impacting their policy positions.

Partisan sources not only cover events and issues that favor their party, but their messages also feature considerable aversion for the out-party (for a review of this literature, Groeling (see 2013). An analysis of programming from cable television, talk radio, and political blogs found that "efforts to provoke visceral responses (e.g., anger, righteousness, fear, moral indignation) from the audience though the use of over-generalizations, sensationalism, misleading or partially inaccurate information, ad hominem attacks, and partial truths about opponents …" occur regularly in the vast majority of programs examined (pg. 29, Sobieraj and Berry 2011).

Whatever the cause, the correlation between preference for partisan media and partisan animus is sizable. In the YouGov survey, we had asked respondents about their feelings towards the parties and assessed their preferences for partisan media (see Appendix B for additional details). People with strongest preferences for partisan media are roughly 7% more polarized than those who prefer moderate sources or are ominvores (see left panel of Figure 4).

As we note above, we also expect exposure to partisan congenial media to skew what people know. Partisan media cover congenial information more often than uncongenial information (Larcinese, Puglisi and Snyder 2011). And such biases can lead to partisan gaps in knowledge and misinformation. Such biases may be responsible for partisans believing that the leaders of their own party are less extreme than they are (Sood and Iyengar 2013).

We collected some evidence for selective learning. Roughly one year after the initial

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study, we surveyed 1000 respondents in a second wave. Between the first and second wave of our study, the IRS scandal enveloped the Obama Administration. The attention devoted to the scandal by various media outlets varied as expected. A Boolean search on archive.org's TV News database of mentions of the words 'IRS' AND 'Tea Party' from January until July 2013 reveals 806 mentions on Fox News, 464 mentions on MSNBC, and 266 mentions on CNN. Given this asymmetry, we expected an asymmetry in knowledge of the IRS scandal between those that preferred partisan media to non-partisan media. And since, right-wing partisan media likely devoted more attention to the IRS scandal than did the left-wing media, we expected Republicans with strong preferences for partisan sources to be more informed about the scandal than Democrats with similar preferences. The expectation was born out (right panel of Figure 4). Those with the strongest preferences for right-wing media knew roughly 10 percent more about the IRS scandal than those with the strongest preferences for left-wing media and

Figure 4: The Relationship between Partisan Selectivity and Affective Polarization & Scandal Knowledge
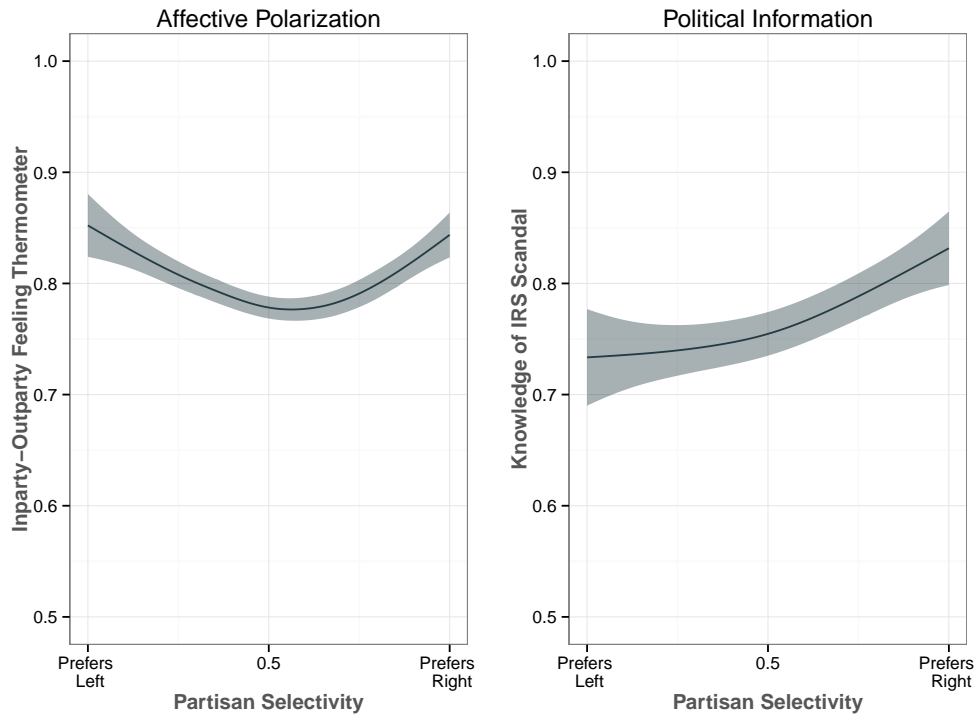
those with mixed preferences.

Despite these strong correlations, untangling the antecedents of imbalances in media exposure from its effects is hard. In most Democratic countries, what people consume is a function of their preferences. Thus, we cannot take correlations between imbalances in consumption and preferences as evidence of causation. It also means that to tally impact of exposure on preferences, we must rely on exogenous changes in people's menu of media choices.

The menus from which people choose in the real world cannot be manipulated easily. But a peek can be had in the lab. That is the strategy that some scholars have used to identify the impact of changes in menu. Manipulations in laboratory or online survey experiments, however, lack ecological validity. The menu of choices in most survey experiments is exceedingly small. And the relative change in the menu as a result of changing even one item, large. These large changes don't translate well to the real world, where the menu is vast, if not limitless, though people limit most of their consumption to a small set of sources.

Our discussion also elides over attempts to identify media effects by forcing exposure to it. Despite their obvious limitations, forced exposure experiments help highlight the extent to which the source matters. But studies providing limited choice suggest that forced exposure exaggerates the impact of exposure to partisan news (Arceneaux and Johnson 2013). Those disinterested in news are unlikely to see it, while those who prefer news tend to hold strong attitudes, and are thus immune to its effects.

Recognizing the limitations of laboratory and mandating exposure, other scholars have tried to capitalize on 'natural experiments,' exogenous changes in menus due to entry and exit of channels (Martin and Yurukoglu 2014), misalignment of strategic incentives and personal preferences in entry of new cable news channels (DellaVigna and Kaplan 2007), and laws affecting price of broadband (Lelkes, Sood and Iyengar 2015), among others. These research designs, however, give us a brief and shallow glimpse into consequences of imbalances in media exposure. For instance, as we note above, we never get to observe, not with any great precision,

how much do people already consume. This means that we must elide over important variation.

Another important limitation is that with instrumental variable models, we only get 'Local Average Treatment Effect' (LATE) estimates. For instance, in Lelkes, Sood and Iyengar (2015), if the assumptions hold, the effect is driven by people who were encouraged to adopt broadband. This particular population of adoptees, however, may not be of sufficient theoretical or political interest, and doesn't answer the question of what would happen if the entire population were to get broadband. If the treatment effects vary by kinds of people, the population estimates can be far from LATE.

A yet more important limitation of most media effects research is that the treatment effects are not calibrated. If we ever want to generalize the findings, we need to know the exact dose delivered. There are a few exceptions. Curran et al., for instance, measure informativeness. But, the treatments are notoriously multidimensional. And we still struggle to map what aspect of the treatment, in what quantity, explains the changes we see.

Discussion

The media have been revolutionized—repeatedly. In the 1970s, most of us wouldn't have forecast the success of cable, and the overwhelming number of options available on it. In the 1980s, most wouldn't have forecast the current version of Internet. And in the early 2000s, most of us wouldn't have forecast the current smartphones, and their success. Or the social media and its success. And again only a few of us would have forecast that miniaturization of cameras and social media would come together to highlight police malpractice. For even if we boast of understanding the larger capitalist institution behind production of technology and content, the future constantly surprises us. For not only do we not understand how technology is created and appropriated, we do not understand us—the customer—very well.

As social scientists, our work is cut out. And while the tools at our disposal have never

been better—access to massive amounts of data, super fast computers along with incredible software that allows us to not only calculate complex things but also allows us to fail quickly, the challenge has also never been greater—the number of devices per person on which people consume information is expected to exceed 6 in the next 5 years.

Add to this, the pessimism that many media scholars feel. The move away from media carried over public waves, means that today the American government has few levers with which to influence what media sources can carry. And in absence of expected policy consequences, some media scholars wonder about the purpose of research. There is some heart to be taken on that front. If not policy, the research can feed into products. For instance, measures of media ideology can be used to build media consumption tools that alert people about the potential bias.

To bring our focus back to the key points of the chapter—social scientists have taken some decisive steps in quantifying the extent to which people consume various media, but a variety of issues remain. In the chapter we have tried to clarify what issues and to what extent they impinge upon our inferences. In the chapter, we also tried to make a case that some more original thinking is needed in how we conceptualize the independent variable and the potential dependent variables. In particular, we think that net imbalance rather than 'selectivity' is a more apt variable for many of the decisions. More generally, we hope that the discussion in the chapter provokes greater discussion on measurement, and helps provide greater clarity to the cost of the trade offs.

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Appendix A   Political Knowledge Over the Lifetime

The data from the American National Election Studies. And each line represents data from a different year.
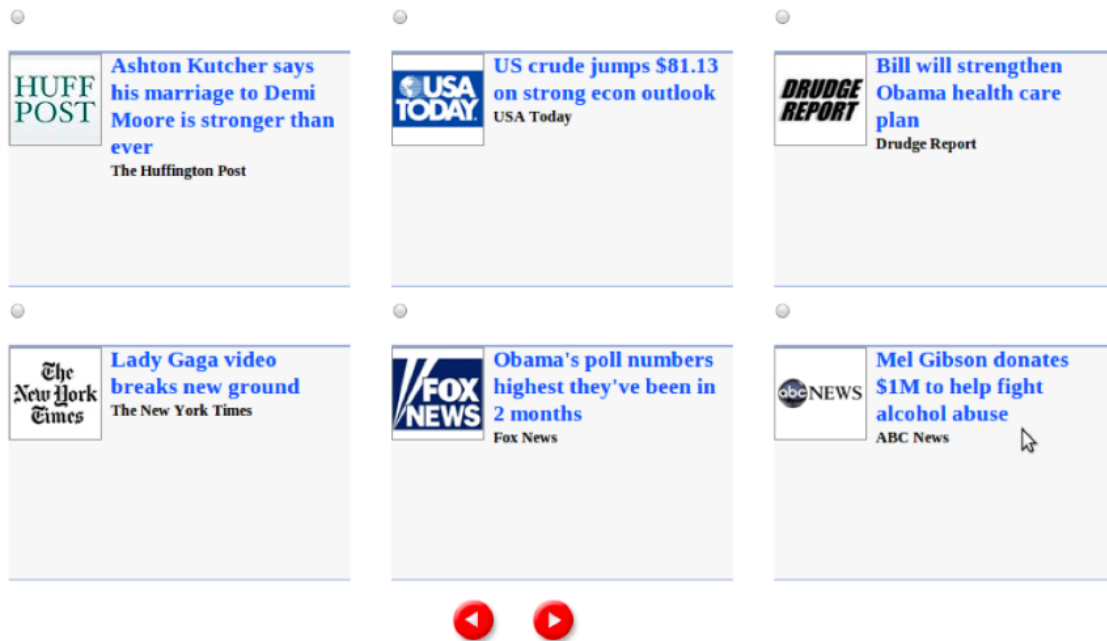
Figure 5: Political Knowledge Over the Lifetime
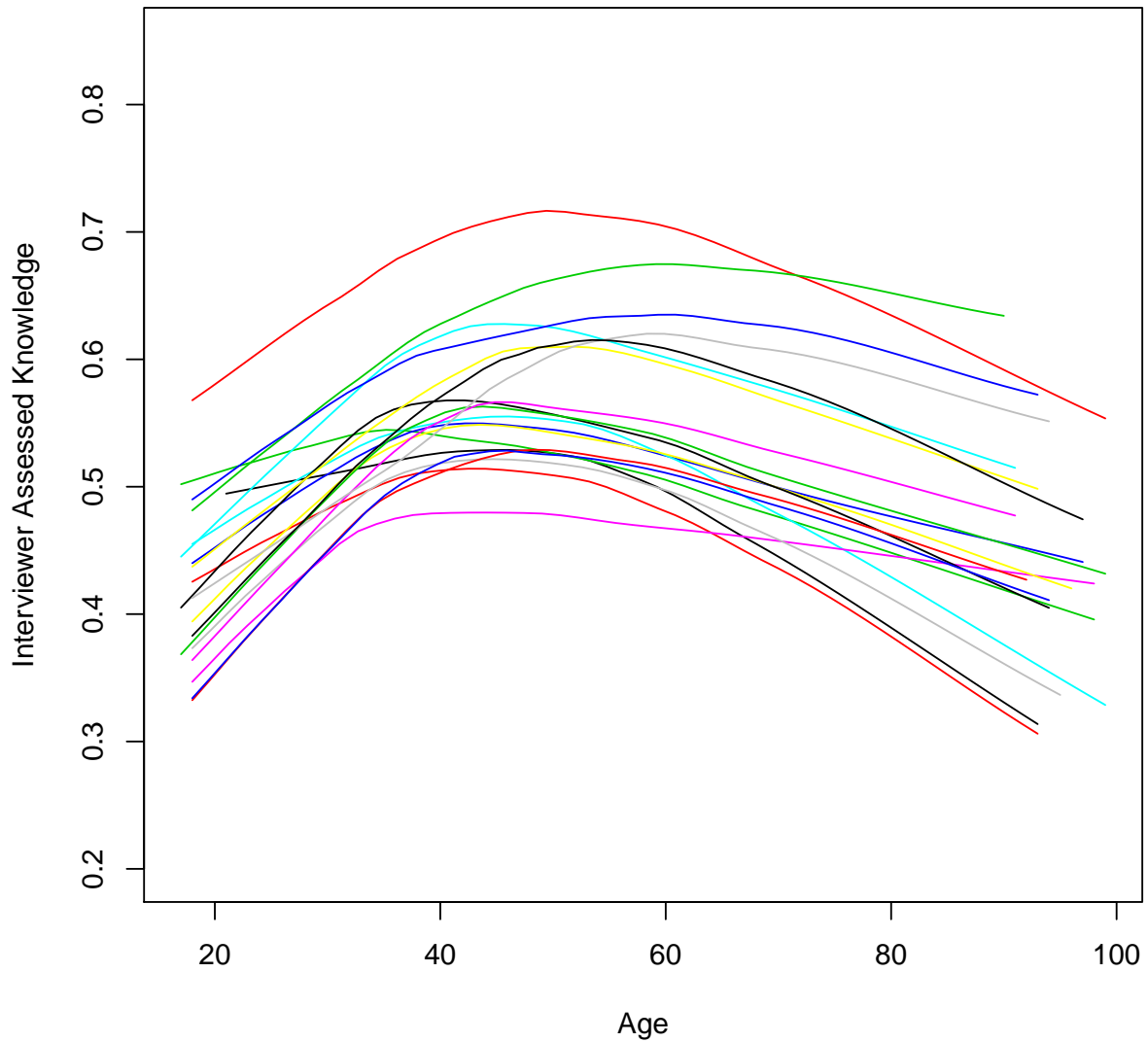
Appendix B   YouGov Study

Figure A1: News Organization Trial

Following the four news selection screens, we asked respondents to select a short video sound bite from major political figures. The objectives of the video selection task were: assess the overlap in selectivity between news sources and campaign advertising, and investigate whether people who preferred to get their news from partisan sources also preferred to listen to their own party's candidates engage in attack-oriented rather than promotional rhetoric.

There were two video selection screens. Each screen featured one prominent Democrat and one prominent Republican making either a positive or negative appeal. For example, respondents could select between two Romney clips, one titled "I'll get America working again" and another titled "We have zero faith in our President." While the first screen presented clips from Obama and Romney, the second screen included clips from Nancy Pelosi and Michele

Figure A2: News Personality Trial
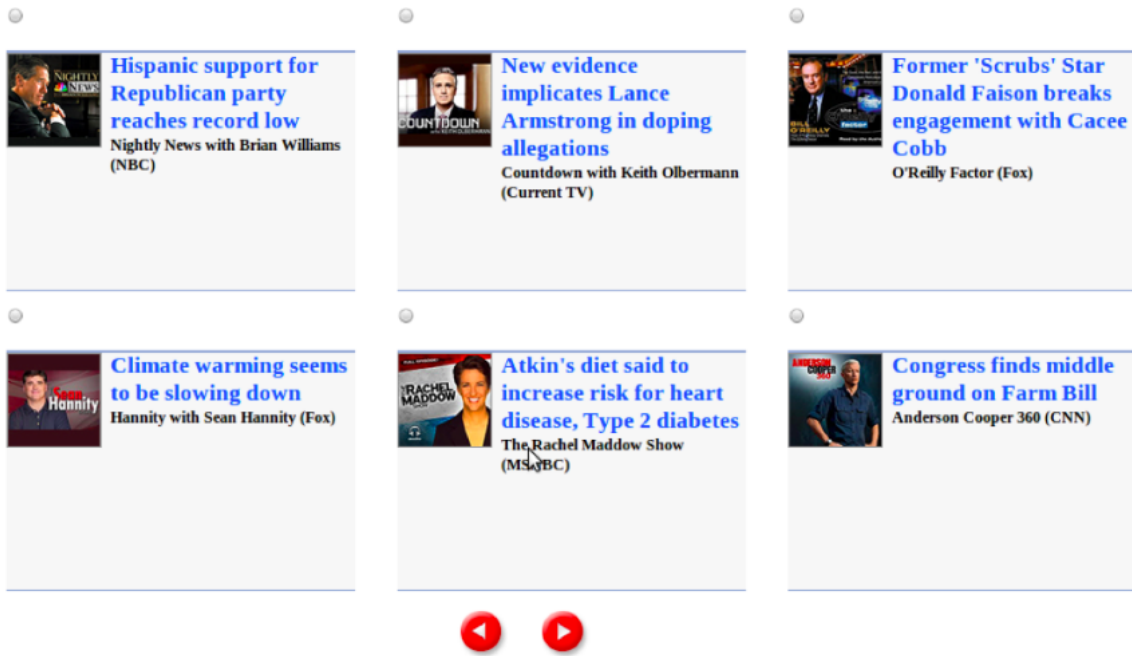
Bachman. The order of videos within each of the two screens was randomized.

Measures

Preference for Soft News. If a respondent selected a soft news story on any trial, we coded it as 1; hard news selections were coded 0. We next fitted these choices as a function of an underlying latent trait (preference for soft news) using a two-parameter item response model (Lord, Ross and Lepper 1979). Letting i index items (trials), j index respondents, the model can be written as follows:

$$P(y_{ij} = 1 | \eta_j) = \frac{exp(\beta_i + \lambda_i \eta_j)}{1 + exp(\beta_i + \lambda_i \eta_j)} \tag{1}$$

In 1, $y_i j$ is respondent j's response to item i, j, is the unobserved preference for soft news (also known as "latent ability") for respondent j, λ_i is the discrimination parameter telling us how much responses to item (trial) i distinguish between respondents who prefer soft news more or less on the latent dimension, and $\frac{-\beta_i}{\lambda_i}$ is the "difficulty" parameter. We recover the ordinal arrangement of respondents on the latent dimension; we rescale the scores to lie between 0 (weakest preference for soft news) to 1 (strongest preference for soft news).

Preference for Partisan Congenial Sources. To estimate preference for partisan congenial sources, we categorized the items into three ordinal categories — left-leaning, right-leaning and non-partisan. We then fit the participants' choices to a graded response model (Samejima 1969; Johnson and Albert 2006), which can be seen as an extension of the two-parameter logistic item response model that we described above. Keeping the notation we used above, and assuming k indexes categories of an item (trial):

$$P(y_{ij} = 1 | \eta_j) = \frac{exp(\beta_i + \lambda_i \eta_j)}{1 + exp(\beta_i + \lambda_i \eta_j)} \tag{2}$$

Once again we rescale our estimate of preference for partisan congenial sources to lie between 0, indicating strongest preference for left-leaning sources in our data, and 1, indicating strongest preference for right-leaning sources in our data.

Scandal Knowledge: To assess knowledge of the IRS scandal, we asked the respondents to identify which groups received extra scrutiny by the IRS (right-wing groups), the name of the IRS commissioner that resigned (Steve Miller), and the location of the IRS office at the center of the scandal (Cincinnati). We added the number of correct answers and rescaled the sum to lie between 0 and 1.